GENERAL NOTES

1. GENERAL REQUIREMENTS

A. DESIGN AND PERFORMANCE OF COMPONENTS AND METHODS SPECIFIED HEREIN SHALL COMPLY WITH THE APPLICABLE PROVISIONS OF THE LATEST NYC BUILDING CODES.

B. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT.

C. VERIFY ALL GOVERNING DIMENSIONS IN THE BUILDING.

D. COORDINATE ALL WORK WITH OTHER TRADES TO MINIMIZE INTERFERENCE WITH EXISTING AND NEW FACILITIES, TO FACILITATE TIMELY COMPLETION AND AVOID NECESSITY FOR CUTTING AND PATCHING. FURNISH TO OTHER AFFECTED TRADES ALL NECESSARY INFORMATION, WORKING DRAWINGS OR MATERIALS REQUIRED FOR INSTALLATION AND COMPLETION OF ALL WORK.

E. PROVIDE WORKMANSHIP OF HIGHEST GRADE. INSTALL ALL PIPING AND SPRINKLER HEADS IN CONFORMANCE WITH MANUFACTURER'S RECOMMENDATIONS, REQUIREMENTS OF NFPA-13, N.Y.C. FIRE DEPARTMENT, AND NEW YORK CITY BUILDING CODE.

F. NO SHUT-DOWN OF EXISTING FIRE PROTECTION SYSTEMS SHALL BE DONE WITHOUT PRIOR WRITTEN PERMISSION FROM THE ENGINEER. REQUESTS FOR SHUT DOWNS MUST BE DELIVERED TO THE ENGINEER AT LEAST (7) SEVEN WORKING DAYS PRIOR TO THE REQUESTED SHUTDOWN AND SHALL BE SUBJECT TO THE FINAL APPROVAL OF THE ENGINEER. KEEP THE SHUT DOWN TIME TO A MINIMUM. DRAINAGE SHALL BE TO A PROPERLY CONNECTED RECEPTACLE WITHOUT CAUSING DAMAGE TO OTHER WORK AND PROPERTY. FIRE PROTECTION SYSTEM SHALL BE PLACED IN OPERATION AT THE END OF EACH WORKING DAY OR FIRE WATCH SHALL BE PROVIDED AT NO

G. ALL UNUSED PIPING, HANGERS, SUPPORTS SHALL BE COMPLETELY REMOVED ALL THE WAY BACK TO THE CORE RISER CLOSET, OR BACK TO THE NEAREST ACTIVE BRANCH MAIN AND CAPPED, SEALED WATERTIGHT. ALL THE OPENINGS RESULTING SHALL BE PROPERLY PATCHED, SEALED, AND FIRESTOPPED TO MAINTAIN THE ORIGINAL INTEGRITY OF THE PARTITION'S FIRE RATING.

H. ALL WORK UNDER THIS SECTION MUST BE PERFORMED BY A LICENSED CONTRACTOR IN THE CITY OF NEW YORK.

I. TYPE AND SIZE OF MATERIALS SHALL BE APPROVED BY NEW YORK CITY BOARD OF STANDARDS AND APPEALS, N.Y.C. FIRE DEPARTMENT, NFPA.

J. THE CEILING IS OF PLASTER TYPE THEREFORE, ALL DAMAGED CEILING THAT OCCURS AS A RESULT OF THE SPRINKLER WORK SHALL BE RESTORED TO ITS ORIGINAL CONDITION BY THIS CONTRACTOR.

2. WORK INCLUDED

A. PROVIDE ALL REQUIRED LABOR, MATERIALS, EQUIPMENT, HYDRAULIC CALCULATIONS, PERMITS, CERTIFICATES, INSPECTION, TESTING AND OTHER SERVICES NECESSARY OR REQUIRED FOR COMPLETE SAFE INSTALLATION OF WORK IN FULL CONFORMANCE WITH NFPA-13 REQUIREMENTS, ALL AS INDICATED ON DRAWINGS AND/OR HEREIN SPECIFIED.

B. INSTALL WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING PIPING DISTURBED IN MAKING SUCH CONNECTIONS TO PERFECT CONDITIONS.

C. ALL PIPING SHALL BE HUNG FROM EXISTING STRUCTURAL STEEL. PROVIDE AUXILIARY STEEL WHEN REQUIRED.

D. PROVISIONS SHALL BE MADE FOR COMPLETE DRAINAGE OF THE SYSTEM.

E. TESTS SHALL BE MADE IN THE PRESENCE OF THE ENGINEER AT LEAST 48 HOURS NOTICE SHALL BE GIVEN IN ADVANCE OF ALL TESTS.

F. THE CONTRACTOR SHALL SUBMIT HYDRAULIC CALCULATIONS FOR REVIEW PRIOR TO THE INSTALLATION OF THE NEW SPRINKLER WORK.

3. SUBMITTALS

A. SHOP DRAWINGS.
1) SPRINKLER HEADS
2) VALVES
3) HANGERS AND SUPPORT
4) PIPE AND FITTINGS
5) SLEEVES AND ESCUTCHEONS
6) SUBMIT FIELD TEST AND RESULT
7) PRESSURE GAUGE
8) PIPING LAYOUT COORDINATED WITH ALL TRADES. INCLUDE ON EACH WORKING DRAWING LAYOUT CERTIFICATE THAT ALL RELATED CONDITIONS HAVE BEEN CHECKED WITH ALL TRADES, AND THAT NO CONFLICT EXISTS. SUBMISSION WILL NOT BE APPROVED WITHOUT SUCH CERTIFICATION.

B. AS BUILT DRAWINGS.
1) PROVIDE MOUNTED SHOP DRAWING FOR EACH FULL FLOOR CORRIDOR SPRINKLER INSTALLATION. THE FINAL AS-BUILT SHOP DRAWING SHALL BE REDUCED TO A WIDTH OF TWO FEET. THE DRAWING SHALL ALSO SHOW THE EXISTING SPRINKLER INSTALLATION ON THE FLOOR, SUPPLY VALVE, ALL PIPE ELEVATIONS, SIZES, DIMENSIONS INDICATING THE LOCATION OF THE LOOP

4. CONNECTION TO EXISTING WORK

A. INSTALL WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING PIPING DISTURBED IN MAKING SUCH CONNECTIONS TO PERFECT CONDITIONS. TEMPORARY SHUT DOWN OF EXISTING SERVICES WITH WRITTEN APPROVAL OF THE ENGINEER AND NOT TO INTERFERE WITH NORMAL OPERATIONS.

5. MATERIALS - GENERAL

A. NOT USED.

B. ALL MATERIALS SHALL BE "UL" LISTED AND "FM" APPROVED.

6. HANGERS AND SUPPORTS

A. UNLESS OTHERWISE SPECIFICALLY APPROVED, HANGER SIZE AND SPACING SHALL BE WITHIN FOLLOWING LIMITS:

PIPE SIZE	MAX.HANGER SPACING	MIN.ROD SIZE
SPRINKLER SYSTEM		
1"	8 FT. O.C.	3/8"
1-1/4" TO 2"	10 FT. O.C.	3/8"
2-1/2" TO 3-1/2"	12 FT. O.C.	1/2"
4" AND 5"	12 FT. O.C	5/8"

THE ABOVE HANGER SPACINGS APPLY TO STRAIGHT RUNS OF PIPE ONLY. AT POINTS WHERE VALVES, SPECIALTIES OR BRANCH CONNECTIONS ARE LOCATED, ADDITIONAL HANGERS OR SUPPORTS SHALL BE USED TO PROPERLY SUPPORT THE LOAD.

B. ALL PIPE HANGERS, INSERTS, SUPPLEMENTAL STEEL, RODS, AND COMPONENTS SHALL BE GALVANIZED.

7. SLEEVES AND ESCUTCHEONS

A. SLEEVES FOR PIPING PASSING THROUGH MASONRY WALLS SHALL BE SCHEDULE 40, STANDARD GALVANIZED STEEL PIPE; IN FRAMED PARTITIONS SHALL BE 20 GAUGE SHEET METAL. THE SPACE BETWEEN THE PIPE AND IT'S SLEEVE SHALL NOT EXCEED ONE-HALF INCH. THE SLEEVE SHALL HAVE A SUFFICIENT LENGTH TO BE FLUSH WITH THE FINISHED WALL SURFACES.

B. EXPOSED PIPING PASSING THROUGH WALLS, FLOORS OR CEILING SHALL BE FITTED WITH CHROMIUM PLATED CAST BRASS ESCUTCHEONS WITH FASTENING SET SCREWS SIMILAR TO FEE & MASON MANUFACTURING CO., F. & S. MANUFACTURING CO., OR RITTER PATTERN AND CASTING CO.

8. CUTTING AND PATCHING

A. PIPING PASSING THROUGH WALLS SHALL HAVE A TRIM OPENING CUT NO GREATER THAN NECESSARY FOR THE INSTALLATION OF A SLEEVE SECURED THEREIN.

B. PIPING PASSING THROUGH CONCRETE FLOORS SHALL HAVE THE OPENING CORE DRILLED SO THAT THE SPACE BETWEEN THE OPENING AND THE PIPE SHALL NOT EXCEED ONE-HALF INCH.

C. ANNULAR SPACES BETWEEN PIPING AND SLEEVES OR CORE DRILLED FLOOR OPENING SHALL BE PACKED WITH MINERAL WOOL AND SEALED, TO RETAIN THE FIRE INTEGRITY OF THE WALLS AND FLOORS, WITH A NON-HARDENING COMPOUND SIMILAR OR EQUAL TO DUXSEAL AS MANUFACTURED BY J.M. CLIPPER CORPORATION.

9. PIPE

A. SPRINKLER: STANDARD WEIGHT SCHEDULE 40 BLACK STEEL PIPE, SEAMLESS OR WELDED MILD STEEL, CONFORMING TO ASTM A-795/A-53.

B. WET FIRE STANDPIPE SHALL BE EXTRA STRONG SCHEDULE 80 BLACK, STEEL ASTM A795/A53.

C. SCHEDULE 10 PIPING IS NOT PERMITTED.

10. FITTINGS

A. SPRINKLER:
1) CAST IRON: THREADED CLASS 125, ANSI B-16.4.
2) MALLEABLE IRON: CLASS 150 THREADED, ANSI B-16.3.
3) NIPPLES SHALL BE EXTRA-HEAVY SHOULDERY TYPE OF SAME MATERIAL AS PIPE. CLOSE NIPPLES ARE NOT ACCEPTABLE.
4) BUSHINGS ARE NOT PERMITTED.
5) UNLESS OTHERWISE SHOWN ON THE CONTRACT DRAWINGS, PIPING CONNECTIONS TO EQUIPMENT SHALL BE MADE UP WITH UNIONS FOR PIPING 2 INCHES AND SMALLER, AND SHALL BE FLANGED FOR PIPING 2-1/2" INCHES AND LARGER.
6) GASKETS FOR FLANGES SHALL BE 1/16-INCH THICK (AFTER COMPRESSION), RUBBER, OR NEOPRENE, FULL-FACED, AND PUNCHED BOLT HOLES.

11. SPRINKLER HEADS

A. IN ALL FINISHED AREAS, SPRINKLER HEADS SHALL BE RELIABLE AUTOMATIC SPRINKLER CO., MODEL G-4 "CONCEALER" BS&A NO. 587-75-SA. THE HEADS SHALL BE WHITE FINISH COVER PLATE, 1/2" ORIFICE SIZE, WITH A 165°F TEMPERATURE RATING.

B. SPRINKLER HEADS IN AREAS WITHOUT HUNG CEILING SHALL BE RELIABLE AUTOMATIC SPRINKLER CO., MODEL G, BS&A NO. 587-75-SA. THE ORIFICE SIZE SHALL BE ½" WITH A 165°F TEMPERATURE RATING.

12. DRAINAGE

A. PROVISIONS SHALL BE MADE FOR COMPLETE DRAINAGE OF THE SYSTEM.

13. INSULATION

A. INSULATION (INCLUDING JACKET, OR FACING AND ADHESIVE) SHALL HAVE COMPOSITE FIRE AND SMOKE HAZARD RATINGS, AS TESTED BY PROCEDURE ASTM E-84, NFPA 255 AND UL 723 NOT EXCEEDING A "FLAME SPREAD" OF 25 AND "SMOKE DEVELOPED" OF 50.

B. INSULATE ALL SPRINKLER PIPE AND FITTINGS WITHIN 15'-0" FROM THE EXTERIOR WALL WITH JOHN MANVILLE MICRO LOCK 1 INCH THICK ONE PIECE FIBERGLASS INSULATION WITH ALL SERVICE JACKET.

C. FITTINGS, VALVES, FLANGES AND ACCESSORIES SHALL BE INSULATED WITH COMPRESSED FIBERGLASS AND WIRED IN PLACE WITH 18-GAUGE GALVANIZED STEEL WIRE. APPLY A UNIFORM COAT OF FIRE RETARDANT VAPOR BARRIER COATING TO THE ENTIRE SURFACE. THEN EMBED INTO WET COAT A LAYER OF FIBERGLASS TAPE EXTENDING 2" ONTO ADJACENT PIPE COVERING. PRE-MOLDED PVC INSULATION COVERS FOR FITTINGS ARE NOT PERMITTED.

14. TESTS

A. PERFORM HYDROSTATIC TESTS FOR ALL SECTIONS OF THE PIPING SYSTEMS INSTALLED UNDER THIS SECTION, AT NOT LESS THAN 200 PSIG PRESSURE FOR TWO HOURS, OR AT 50 PSI IN EXCESS OF THE MAXIMUM PRESSURE, WHEN THE MAXIMUM PRESSURE TO BE MAINTAINED IN THE SYSTEM IS IN EXCESS OF 150 PSIG. THE TEST PRESSURE SHALL BE READ FROM A GAUGE LOCATED AT THE LOW ELEVATION POINT OF THE INDIVIDUAL SYSTEM, OR PORTION OF THE SYSTEM BEING TESTED.

B. TESTS SHALL BE MADE IN THE PRESENCE OF THE ENGINEER. AT LEAST 48 HOURS NOTICE SHALL BE GIVEN IN ADVANCE OF ALL TESTS.

C. PROVIDE AND INSTALL NECESSARY EQUIPMENT, INSTRUMENTS, HARDWARE, TEMPORARY PIPING, VENTS, DRAINS, AND INCLUDE NECESSARY PERSONNEL REQUIRED TO PERFORM ALL TESTS.

D. ALL TEST SHALL CONFORM TO THE REQUIREMENTS OF NFPA 14. RECORDS OF ALL TESTS SHALL BE MADE AVAILABLE FOR THE ENGINEER'S INSPECTION, AS REQUIRED.

E. SHOULD THE TESTS REVEAL ANY LEAKS OR DEFICIENCIES IN PIPING INSTALLED UNDER THIS SECTION, MAKE NECESSARY CORRECTIONS IMMEDIATELY AND FLUSH, CLEAN AND RETEST THE SYSTEM FOR THE ENGINEER'S APPROVAL AT NO COST TO THE AUTHORITY.

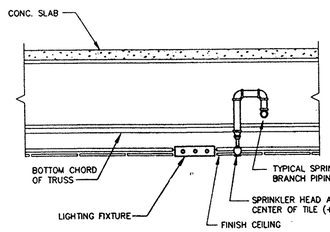
F. REPAIR OR REPLACE ANY PORTION OF THE SYSTEM INSTALLED UNDER THIS SECTION THAT IS DAMAGED AS A RESULT OF TEST OPERATIONS AT NO COST TO THE AUTHORITY.

G. DISPOSE OF WATER REMOVAL FROM PIPELINES IN A MANNER THAT SHALL NOT CAUSE DAMAGE TO ANY PROPERTY.

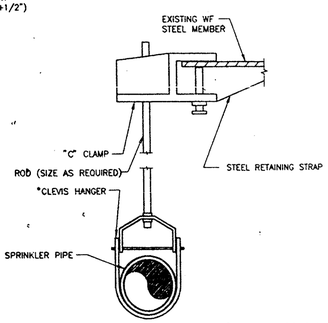
DESIGN CRITERIA

ENTIRE SYSTEM SHALL BE HYDRAULICALLY CALCULATED TO MEET FOLLOWING CRITERIA:

A. SPRINKLER SYSTEM
1) ORDINARY 1 HAZARD OCCUPANCY - STORAGE ROOMS, COMMERCIAL SPACES/RETAIL AREA DENSITY .16 GPM PER SQ. FT. OVER MOST HYDRAULICALLY REMOTE 1500 SQ. FT., MAXIMUM COVERAGE PER SPRINKLER HEAD 130 SQ. FT.
2) LIGHT HAZARD OCCUPANCY - ALL OFFICE AREAS: DENSITY .10 GPM PER SQ. FT. OVER MOST HYDRAULICALLY REMOTE 1500 SQ. FT., MAXIMUM COVERAGE PER SPRINKLER HEAD 225 SQ. FT.
3) EXACT LOCATION OF SPRINKLER HEADS IN FINISHED AREAS WITH SUSPENDED CEILINGS SHALL BE AS INDICATED ON ARCHITECTURAL REFLECTED CEILING PLANS.
4) MINIMUM PRESSURE AT SPRINKLER HEAD 7 PSI.
5) EQUIVALENT FITTING LENGTHS USED IN HYDRAULIC CALCULATIONS SHALL BE IN ACCORDANCE WITH NFPA STANDARD No. 13.
6) DISCHARGE FROM EACH SPRINKLER HEAD SHALL NOT BE LESS THAN FOR REQUIRED AREA COVERED BY THIS HEAD. AREA COVERAGE PER HEAD SHALL BE DETERMINED IN ACCORDANCE WITH NFPA STANDARD No. 13, PARAGRAPH 7-4.3.1.2.
7) HYDRAULIC CALCULATIONS SHALL BE BROUGHT BACK TO CONNECTION TO THE RISER, OR SPRINKLER SUPPLY VALVE. (F.C.A.)
8) FLOW VELOCITY IN PIPING SHALL NOT EXCEED 20 FPS.



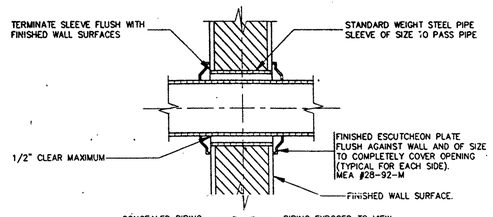
LOCATION OF PIPE IN SUSPENDED CEILING
(WITHOUT TRUSS IN THE CEILING)
NOT TO SCALE



GENERAL PURPOSE HANGERS MAY BE USED ON 1" SPRINKLER PIPING ONLY.
* CLEVIS HANGER REQUIRED ON PIPING LARGER THAN 1"

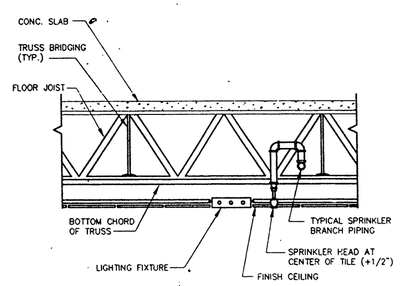
TYPICAL HANGER DETAIL
NOT TO SCALE

FIRE PROTECTION LEGEND	
—SP—	EXISTING SPRINKLER PIPING TO REMAIN
—SP—	SPRINKLER PIPING
~~	REMOVE EXISTING PIPING
O	EXISTING SPRINKLER TO REMAIN
●	PENDENT TYPE SPRINKLERS HEADS
S	CONNECT NEW TO EXISTING WORK
—→	CAP PIPING
F.C.A.	FLOOR CONTROL ASSEMBLY

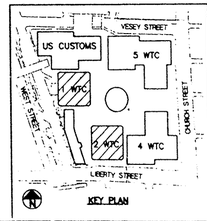


NOTE:
ANNULAR SPACE BETWEEN PIPING AND SLEEVE TO BE PACKED WITH THERMOFIBER OR MINERAL WOOL TO RETAIN THE FIRE INTEGRITY OF THE WALL.

DETAIL OF PIPE PENETRATING THRU RATED WALL
NOT TO SCALE



LOCATION OF PIPE IN SUSPENDED CEILING
(WITH TRUSS IN THE CEILING)
NOT TO SCALE



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1	6/24/98	AS BID	DC

Engineering Department
Design Division
The World Trade Center

Title
TOWER 1 & 2
FLOOR 44 & 78
SPRINKLER
GENERAL NOTES
SYMBOL LIST AND
DETAILS

This drawing subject to conditions in contract. All inventions, ideas, designs and methods herein are reserved to Port Authority and may not be used without its written consent.

D.C.	M.P.	455,000
Designed by	Drawn by	JRLA JOB No.
4/27/98	D.C.	AS SHOWN
Date	Checked by	Scale

Contract Number WTC-857.090
Drawing Number SP-1